Childlike Terms Of Physics

Yash Sharma

Nitish Kumar

NOTION PRESS

India. Singapore. Malaysia.

NOTION PRESS
India. Singapore. Malaysia.

Published by Notion Press
Copyright © Yash Sharma & Nitish Kumar
All Rights Reserved.

ISBN 9781637140291
First edition 2020
Second edition 2021

This book has been published with all reasonable efforts taken to make the material error-free after the consent of the author. No part of this book shall be used, reproduced in any manner whatsoever without written permission from the author, except in the case of brief quotations embodied in critical articles and reviews

DEDICATED TO

ALL THE LITTLE ONES WHO HAVE A KEEN INTEREST IN PHYSICS.

CONTENTS

1	Important Terms	Pg. #8-83
2	System of Units	Pg. #84-89
3	Interesting Questions	Pg. #89-93

Remember,
The blank spaces in this book are for you all to research about new things and pen it down here.

1

IMPORTANT TERMS

(A)

Absolute Zero – Lowest possible temperature at which a gas would have zero volume.

Absorption Spectrum – Spectrum of electromagnetic radiation absorbed by matter when radiation of all frequencies is passed through it.

Absolute Deviation – The difference between a single measured value and the average of several measurements made in the same way.

Absolute Error – The difference between a measured value and the actual value of a quantity.

Absolute Humidity – The mass of water vapor present in unit volume of moist air.

Acceleration – Rate of change of velocity of an object with respect to time. It is denoted by "***a***"

Accuracy – Closeness of a measured value to the standard value.

Achromatic – Capability of transmitting light without decomposing it into its constituent colors.

Achromatic Lens – A lens that is designed to limit the effects of chromatic and spherical aberration.

Action-Reaction Force – A pair of forces involved in an interaction that are equal in magnitude but opposite in direction.

Activity – Number of decays per second of a radioactive substance.

Adhesion – Force of attraction between two unlike materials.

Adiabatic – Any change in which there is no transfer of heat.

Adiabatic Process – A thermodynamic process in which no heat is added or removed from a system.

Adiabatic Cooling – The cooling from energy lost by expansion.

Adiabatic Heating – The heating from energy gained by compression.

Aerodynamics – Study of motion of air while interacting with solids.

Afocal Lens – A lens of zero convergent power; whose focal points are infinitely distant.

Air Resistance – Force applied by air on objects moving through it.

Alpha Decay – Process in which a nucleus emits an alpha particle.

Alpha Particle – Positively charged particles consisting of two protons and two neutrons emitted by radioactive materials.

Alternating Current – A type of electric current which changes its direction periodically.

Alternator – An electrical generator that converts mechanical energy to electrical energy in the form of alternating current.

Ammeter – A device used to measure electric current.

Ampere – It is the S.I. unit of electric current and is also called as coulombs/second.

Amplitude – The maximum displacement moved by a point on a vibrating body or wave measured from its equilibrium position.

Anemometer – A device used to measure the velocity and direction of wind.

Angle of Incidence – The angle formed between the incident ray

and the normal to the reflecting/refracting surface.

Angle of Reflection – The angle formed between the reflected ray and the normal to the reflecting surface.

Angle of Refraction – The angle formed between the refracted ray and the normal to the refracting surface.

Angle of Repose – The angle of inclination of a plane with the horizontal.

Angstrom – The metric unit of length. 1 Angstrom = 10^{-10}m

Angular Displacement – The shortest angle between the initial and the final position for an object in a circular motion around a fixed point.

Angular Impulse – The product of a torque and the time interval during which it acts.

Angular Velocity – Rate of change of angular displacement.

Angular Acceleration – Rate of change of angular velocity.

Angular Momentum – The moment of linear momenta of all the particles of a rotating body.

Annihilation – A process in which a particle and its antiparticle collide and disappear, releasing energy.

Anode – An electrode through which the conventional current enters into a polarized electrical device/circuit.

Anti-Matter – Matter composed of antiparticles.

Antiparticle – A counter part of subatomic particles having opposite properties.

Antenna – Device used to transmit or receive electromagnetic waves.

Anti-Neutrino – Subatomic particle with no charge or mass. These are emitted in beta decays.

Antinode – Point of maximum displacement of two superimposed waves.

Aperture – The circular area that determines the amount of light falling on a mirror or a lens.

Apparent Power – The product of effective values of alternating current and voltage.

Archimedes Principle – It states that the upward buoyant force that is exerted on a body immersed in a fluid, whether fully or partially submerged, is equal to the weight of the fluid that the body displaces.

Armature – A coil of wire formed around a soft iron/steel core that rotates in the magnetic field of a generator or motor.

Astronomical Unit – The distance from earth to the sun. It is equal to approx. 150 million kilometers.

Atom – Small unit of matter consisting subatomic particles like electrons, protons and neutrons.

Atomic Mass Unit – A unit of mass for expressing masses of atoms, molecules, or nuclear particles equal to 1/12 the mass of a single atom of most abundant carbon isotope – CARBON 12.

Atomic Number – Number of protons in the nucleus of an atom.

Atmospheric Column – The entire body of air above the specified area.

Atmospheric Pressure – Force exerted per unit area by an atmospheric column.

Audio Signal – Representation of sound, using either a level of

electric voltage for analog signals, or a series of binary numbers for digital signals.

Average Acceleration – Rate of change of velocity for a particular interval of time.

Average Velocity – Total displacement divided by total time taken.

(B)

Back EMF – An electromotive force or 'Voltage' that opposes the change in current which induced it.

Balanced Force – The resultant of all the forces acting on a body is 0.

Balmer Lines – Lines in the spectrum of hydrogen in visible region.

Band Gap – The distance between the valence band of electrons and the conductions band.

Bar – Metric unit of pressure. 1Bar = 100 KPa.

Barometer – An instrument used to measure air pressure or atmospheric pressure.

Baryon – A type of composite subatomic particle which contains an odd number of valence quarks (at-least 3).

Battery – Collection of two or more cells whose chemical reactions create a flow of electrons in a circuit.

Beam of Light – A group of parallel light rays.

Beat – Slow oscillation in amplitude of a complex wave.

Beats – Periodic and repeating fluctuations heard in the intensity of a sound when two sound waves of very similar frequencies interfere with one another.

Becquerel – The activity of a quantity of radioactive material in which one nucleus decays per second.

Bernoulli's Principle – It states that an increase in the speed of a fluid occurs simultaneously with a decrease in static pressure or a decrease in the fluid's potential energy.

Bernoulli's Theorem – When a non-viscous and incompressible liquid flow in a streamline path then the total energy per unit volume remains constant.

Beta Decay – A type of radioactive decay process in which an electron or positron and neutrino is emitted from a nucleus.

Beta Particle – High-energy and high-speed electron or positron emitted by the radioactive decay of an atomic nucleus during the process of beta decay.

Binding Energy – The smallest amount of energy required to remove a particle from a system of particles.

Black Hole – A region of spacetime where gravity is so strong that no particles or even electromagnetic radiation such as light can escape from it.

Boiling Point – Temperature at which a substance, under normal atmospheric pressure, changes from a liquid to vapor state.

Boson Particles – A particle that follows Bose-Einstein's statistics.

Boyle's Law – At constant temperature, pressure is inversely proportional to the volume of the gas.

Breeder Reactor – A nuclear reactor that converts non-fissionable nuclei to fissionable nuclei while producing energy.

Bubble Chamber – A vessel filled with a superheated transparent liquid used to detect electrically charged particles moving through it.

Buoyant Force – Upward force exerted on an object that is partially or wholly immersed in a fluid.

(C)

Calorie – Unit of energy.1Cal = 4.184J

Calorimeter – An instrument used to measure the quantity of heat transferred to or from a body.

Candela – Unit of luminous intensity. 1 candela = 12.6 lumens

Capacitance – Ratio of maximum charge that can be stored in a capacitor to the applied voltage across its plates.

Capacitor – Passive electronic component used to store charge and electrical energy in the electric field.

Carnot Efficiency – Maximum efficiency that a heat engine may have while operating between the two temperatures.

Carnot's Theorem – No engine operating between two temperatures can be more efficient than a reversible engine working between the same two temperatures.

Cathode – An electrode through which the conventional current flows out from a polarized electrical device/circuit.

Cathode Rays – Stream of electron leaving the negative electrode(cathode) in a discharge tube.

Centre of Curvature – The center of sphere of which the spherical mirror is part of.

Centre of Gravity – A hypothetical point around which the force of gravity appears to act.

Center of Mass – A point at which whole of the mass of the body or all masses of a system of particle appear to be concentrated.

Center of Rotation – A point around which a plane figure rotates.

Centripetal Acceleration – Acceleration directed towards the

center of a circular path.

Centripetal Force – A force that makes a body follow a curved path.

Centrifugal Force – The force that is felt by an object moving in a curved path that acts outwardly away from the center of rotation.

Chain Reaction – (i) A sequence of reactions where a reactive product or by-product causes additional reactions to take place.

(ii) A process in which neutrons released in fission produce an additional fission in at least one further nucleus.

Charles Law – It states that the volume of an ideal gas is directly proportional to the absolute temperature at constant pressure.

Chromatic – Capability of transmitting light while decomposing it into its constituent colors.

Chromatic Aberration – Failure of a lens to focus all the colors to the same point.

Circular Motion – Motion of a body following a circular path.

Closed System – In thermodynamics, a system which can exchange energy but not matter with the surrounding.

Cloud Chambers – A device used to detect ionizing particles and to determine their trajectories.

Coherence– The property of two wave trains with identical wavelengths and a constant phase relationship.

Cohesion – Force of attraction between similar molecules.

Coherent Light – Light such that all of associated waves have the same wavelength and are in phase.

Coherent Sources – Sources that produce two waves having same

frequency, same waveform and have constant phase difference between them.

Complementary Colors – Pairs of colors which when mixed together, produce greyscale colors like black or white.

Compound Machine – A machine consisting two or more than two simple machines.

Compton Effect – Interaction of photons, usually X-rays, with electrons in matter resulting in increased wavelength of X-rays and kinetic energy of electrons.

Compression – (i) A region in a longitudinal wave where the particles are closest together.
(ii) Application of inward pushing force on an object.

Concave Lens – A lens which is thinner in center than edge. It is a diverging lens.

Concave Mirror – A mirror whose center of curvature is on the reflecting side. It is a converging mirror.

Concurrent Forces – Forces intersecting through a single point.

Conduction Band – Band of orbitals that are high in energy and are generally empty.

Conductance – Property of a substance to conduct electricity. It is the reciprocal of ohmic resistance.

Conductors – Substances which allow heat and electricity to flow through them.

Condensation – Process of changing a substance from its gaseous state to its liquid state.

Condensation Point – The temperature at which a gas or vapor changes to liquid.

Conservation of Angular Momentum – If the net torque acting on a rigid body is zero then the angular momentum of the body is conserved.

Conservation of Energy – Energy can neither be created nor be destroyed, it can just be transformed from one form to another.

Conservation of Mass – Mass of an object or collection of an object remains constant. It never changes. The mass of whole universe is constant.

Conservative Forces – The forces which only depend upon the initial and final position of the particle. Like gravitational force and electrostatic force.

Conserved Properties – Properties that are same before and after an interaction.

Consonance – Combination of two or more different sounds that results in a pleasant sound.

Constant Acceleration – Acceleration that does not changes in time.

Constant Velocity – Velocity that does not changes in time.

Constructive Interference – Superposition of waves resulting in combined wave with amplitude larger than the component wave.

Convection – Transfer of heat due to bulk movement of molecules within fluids.

Conventional Current – Current which flows from positive terminal to negative terminal.

Converging Lens – Lens that causes light rays to converge.

Convex Lens – A lens which is thicker in center than edge. It is a converging lens.

Convex Mirror – A mirror whose center of curvature is on the opposite of the reflecting side. It is a diverging mirror.

Cosine – The ratio of the adjacent side to the hypotenuse.

Cosmic Ray – High energy nuclear particles apparently originating from space and moving with speed of light.

Coulomb – It is the S.I. unit of electric charge.

Coulomb's Law – The electrical force between two charged bodies is directly proportional to the product of the quantity of charge on the bodies and inversely proportional to the square of the distance between the two bodies.

Couple – A pair of forces, equal in magnitude acting opposite in direction in the same plane but not along the same line.

Crest (of wave) – Highest point of wave motion.

Critical Angle – Angle of incidence which provides an angle of refraction of 90 degrees.

Critical Pressure – The pressure needed to liquify a gas at its critical temperature.

Critical Temperature – The temperature to which a gas must be cooled before it can be liquified by pressure.

Critical Velocity – Velocity below which the flow of liquid is streamlined and above its turbulent.

Current Sensitivity – Current per unit scale division of an electric meter.

Cut off Frequency – (i) A frequency level above or below which a device fails to work.
(ii) A characteristic frequency of incident light below for a given material the photoelectric emission of electron ceases.

Cut off Potential – The negative potential on the collector of photoelectric cell that reduces the photoelectric current to zero.

Cycle – A series of changes produced in sequence that re-occurs periodically.

Cyclotron – A device used to accelerate charged particles.

(D)

Damping – The reduction in amplitude of a wave due to the dissipation of wave energy.

Decay Constant – The ratio between the number of decaying per second and the total number of nuclei. Probability of decay per unit time.

De-Broglie Waves – The property of a material object that varies in time or space while behaving similar to waves. These are also called matter waves.

De-Broglie Wavelength – Length of De-Broglie wave of particle. Planck's constant divided by momentum of particle.

Decibels – Unit of sound level.

Dees – Electrodes of cyclotron.

Dehumidification – The process of removal of water vapor/moisture/humidity from air.

Dehumidifier – A device which reduces the level of humidity from air.

Density – Mass of a substance per unit volume.

Derived Units – Units of quantities that consists of combination of fundamental units.

Destructive Interference – Superposition of waves resulting in a combined wave with zero amplitude.

Dew – Condensation of moisture from atmosphere into droplets of liquid on surfaces.

Dew point Temperature – The temperature at which air is saturated with moisture/water vapor.

Diamagnetism – The property of substances whose atoms have no permanent magnetic dipole moment.

Dichroism – Property of certain crystalline substances in which one polarized component of incident light is absorbed and the other is transmitted.

Di-Electric – An insulating material or very poor conductor of electricity.

Di-Electric Constant – The ratio of electric permeability of the material to the electric permeability of vacuum.

Diffraction – The spreading of waves while encountering obstacles.

Diffraction Angle – The angle that a diffracted wave forms with the grating plane.

Diffraction Grating – Optical component with a periodic structure that splits and diffracts light into several into several beams travelling in different directions.

Diffuse Reflection – The reflection of light from a surface such that an incident ray is reflected at many angles rather than at just one angle.

Dimension–The magnitude of length, breadth and height of any object.

Dimensional Analysis – Checking a derived equation by making sure dimensions are same o both the sides.

Diode – Electrical component which allows current to flow only in one direction.

Diopter – It is the reciprocal of meter and is the unit of power of a lens

Dipole – Two oppositely charged poles separated by a distance.

Direct Current – The current which flows only in one direction.

Dispersion of Light – The process of splitting of white light into its constituent colors.

Displacement – Minimum distance between two points.

Dissipative Force – Forces that cause energy to lost in a system undergoing motion. Forces for which the law of conservation of mechanical energy does not hold true.

Dissonance – Combination of two or more different sounds that results in an unpleasant sound.

Distance – Total length of the path between two points.

Diverging Lens – Lens that causes light rays to diverge.

Domains – A microscopic magnetic region composed of a group of atoms whose magnetic fields are aligned in a common direction.

Dopants – Small quantities of material added to semiconductor to increase electrical conductivity.

Doping – The addition of impurity to a semiconductor to increase its electrical conductivity.

Doppler Effect – The apparent change in the frequency of a wave due to relative motion between the source and the observer.

Doppler Shift – Change in wavelength due to relative motion of source and detector.

Dot Product – Product of two vector quantities by which a scalar quantity is obtained.

Drift Tubes – Charged cylinders used to accelerate charged subatomic particles in a linear accelerator.

Dynamics – Study of forces and their effects on motion.

(E)

Echo – Single reflection of a soundwave from a surface that can be distinguished from the original soundwave.

Eddy Currents – Closed loop of induced current set up in a piece of conductor when there is relative motion between the conductor and the magnetic field.

Edison Effect – The emission of electrons from a heated metal in vacuum.

Effective Current – The magnitude of an alternating current having the same heating effect as that of a given magnitude of direct current.

Effective Voltage – The magnitude of voltage sine waveform (AC voltage) having the same heating effect as that of a given magnitude of DC voltage.

Efficiency – The ratio of output work to input work. Measure of energy conserved in a process.

Elastic Collision – Interaction between two bodies in which the total kinetic energy is same, before and after the interaction.

Elastic Limit – Greatest stress that can be applied to an object without causing a permanent deformation.

Elasticity – Ability of a deformed object to return to its original shape and size when the forces causing deformation are removed.

Elastic Potential Energy – The potential energy in a stretched or compressed object.

Electric Charge – A condition that results into an imbalance between number of protons and number of electrons in a substance. It is the physical property of a matter that causes it to experience a force when placed in an electromagnetic field.

Electric Charge Pump – A device which is used to increase potential difference or voltage generally using capacitors.

Electric Current – Amount of charge flowing through a conductor in unit time. Rate of flow of charges.

Electrical Circuit – A continuous and closed path of an electric current.

Electric Energy – The energy supplied by the source of emf in maintaining the current in circuit.

Electric Field – A space around an electrically charged body where any other electrically charged body will experience force.

Electric Field Lines – A curve drawn in such a way that the tangent to it at each point is in direction of the net field at that point.

Electric Field Strength – The force acting on a unit positive charge inside an electric field.

Electric Generator – A device which converts mechanical energy into electrical energy.

Electric Potential – Work done in moving a unit positive charge from infinity to a point.

Electric Potential Energy – Total potential energy per unit charge.

Electrochemical Cell – A device which converts chemical energy into electrical energy.

Electrode – A strong conduction element used to make contact with non-metallic part of a circuit.

Electrolysis – The process of decomposing ionic compounds by passing a direct current through them.

Electrolyte – Solution of ionic substances which conduct electricity.

Electromagnet – A magnet formed temporarily due to magnetic field of electric current.

Electromagnetic Field – A region around an electromagnetic where its magnetic force can be felt.

Electromagnetic Force – A force generated due to either static electric charges or moving electric charges.

Electromagnetic Induction – The phenomenon in which an electric current is induced in an electric circuit due to changing magnetic field.

Electromagnetic Radiation – Electromagnetic radiant energy carried out by electromagnetic waves throughout space.

Electromagnetic Waves – Waves that are created as a result of vibrations between an electric field and magnetic field.

Electromotive Force – Potential difference produced due to electromagnetic induction or electrochemical process.

Electrons – An electron is a subatomic particle which is negatively charged and caries a charge of $-(1.673*10^{-19})$ C.

Electronic Configuration – The arrangement of electrons in orbits & sub orbits around the nucleus of an atom.

Electronics – The branch of physics dealing with the emission, behavior and effects of electrons.

Electron Cloud – The region around a nucleus of an atom where there Is a high probability of finding electrons.

Electron Volt – The energy gained by an electron while moving across a potential difference of 1 volt. It is a unit of energy. $1eV = (1.6*10^{-19})$ J.

Electron Diffraction – Effects on electrons due to wavelike interference of electrons with matter.

Electron Pair – A pair of electrons that occupy same molecular orbital but they have opposite spins.

Electroscope – A device used to detect electric charges.

Electrostatics – Study of properties and results of electric charges at rest.

Electroweak Force – Unification of electromagnetic and weak forces.

Elementary Charge – The charge carried by a single proton or the magnitude of charge carried by a single electron. It is equal to (1.6*10^-19) C.

Emission Spectrum – Spectrum produced from radiation by excited atoms.

Emissivity – The ratio of radiant energy leaving a surface to that of a black surface at the same temperature and with the same area.

Endothermic – A process which requires heat to take place.

Energy – Quantitative property which is capable of causing changes in matter.

Energy Density – The amount of available energy per unit volume.

Energy Level – Different orbits around nucleus in which electrons revolve.

Entropy – (i) Measure of disorder in a system.
(ii) Ratio of thermal energy to unit temperature that is unavailable for doing useful work

Equilibrant Force – Force needed to bring an object into transitional equilibrium.

Equilibrium – Condition in which the resultant force is equal to 0.

Equivalent Resistance – Single resistance that could replace several resistors.

Erg – CGS unit of work or energy. 1erg = $1*10^{-7}$ J. 1erg = 1dyne*1cm.

Escape Energy – The minimum amount of energy given to a body from the surface of the earth so it escapes from the earth's gravitational field and never returns back.

Escape Velocity – The minimum velocity given to a body from the surface of the earth so it escapes from the earth's gravitational field and never returns back.

Evaporation – Change of water from its liquid state to its vapor state using surrounding's heat energy.

Excitation –The addition of discrete amount of energy in a system.

Excited State – A state in which a system has higher energy than the ground state.

Exothermic – A process which produces heat energy.

External Forces – The forces exerted from outside the structure.

Extrinsic Semiconductor – A semiconductor in which conduction is primarily the result of added impurities.

NOTES

(F)

Farad – It is the unit of capacitance and it stands for Coulombs per volt.

Faraday's Law – It states that change in magnetic flux or magnetic field produces induced electromotive force (EMF).

Ferromagnetism – A property of substance due to which it is strongly attracted towards magnet.

Ferromagnetic Materials – The materials which shows magnetic properties in the absence of external magnetic field.

First Harmonic – The lowest frequency produced by any instrument.

First Law of Motion – An object will remain at rest or in motion until and unless an external force is applied to it.

First Law of Photoelectric Emission – The rate of emission of photoelectrons is directly proportional to the intensity of the incident light.

First law of Thermodynamics – It states that energy can neither be created nor be destroyed. Energy is always conserved and transformed from one form to another.

Fission – A process in which the nucleus of an atom splits into two or more smaller/lighter nuclei.

Fleming's Left-Hand Rule – If the forefinger, second finger and the thumb are stretched at right angles to each other, with the forefinger in the direction of the magnetic field and the second finger in the direction of the current then the thumb indicates the direction of force.

Fleming's Right-Hand Rule – If the forefinger, second finger and the thumb are stretched at right angles to each other, with the

forefinger in the direction of the magnetic field and the thumb in the direction of the motion of the wire then the current in the wire is in the direction of the second finger.

Fluid – Substances/matter that can flow i.e. liquids, gases and plasmas.

Focal Length – The distance from the focus/focal point to the pole.

Focal Point – Location at which rays parallel to the optical axis of an ideal mirror or lens converge to a point.

Focal Plane – A plane that normally(perpendicular) passes through the focus/focal point.

Focal Length – The distance from the focus/focal point to the pole.

Forbidden Gap – Energy requires by an electron to jump from a valence band to conduction band. Energy values that electrons in a semiconductor or insulator does not have.

Force – A push or pull that tends to change the state of motion or state of rest of a body.

Force of Gravitation – A force of attraction acting between two masses.

Forced Vibration – A vibration in a body caused due to an external force.

Forward Bias – Voltage applied to the p-n junction of a semiconductor which increases the current across the junction.

Frame of Reference – Set of coordinates that are used to determine the position and velocity of an object in that frame.

Fraunhofer Lines – Absorption lines in the sun's spectrum due to gasses in solar atmosphere.

Free Fall – The motion of a body under the effect of gravity only.

Freezing Point – The temperature at which a liquid starts to change to its solid state.

Frequency – Number of oscillations/occurrences per second.

Friction – Forces opposing the relative motion of two objects in contact.

Frictional Force – A force generated due to roughness of two objects in contact which opposes the motion of both the objects.

Fundamental Frequency – The lowest frequency at which a system vibrates freely.

Fundamental Particles – Subatomic particles that do not have a substructure. Those particles of which all materials are composed of i.e. quarks and leptons.

Fundamental Tone – Lowest frequency sound produced by a musical instrument.

Fundamental Units – Set of units on which the measurement system is based i.e. meter, second, kilogram, kelvin, mole, ampere and candela.

Fuse (electric) – An electrical safety device which protects devices from getting damaged due to overcurrent.

Fusion – A process in which two or more nuclei are combined together to form one or more different nuclei with the release of energy.

(G)

Galvanometer – A device used to detect and indicate the direction of electric current.

Gamma Decay – Process in which a nucleus emits a gamma ray.

Gamma Ray – An electromagnetic wave of very high energy, very high frequency and short wavelengths.

Gas – It is a state of matter consisting of particles that have no defined volume or shape.

Geiger-Muller Tube – A device which is used to detect radiation using its ability to ionize matter.

Global Warming – A term used to describe the increase in average global temperature due to the greenhouse effect.

Graham's Law of Diffusion/Effusion – It states that the rate of diffusion/effusion of a gas is inversely proportional to the square root of its density.

Gravitational Field – The region around a gravitating mass where it's gravitational influence can be felt.

Gravitational Force – The force of attraction between two masses.

Gravitational Interaction – The interaction between particles of matter that has no known distance limitations.

Gravitational Mass – The mass of a body as measured by its gravitational attraction for other bodies.

Gravitational Potential Energy – The energy acquired by an object due to change in its positions (height) when it is present in a gravitational field.

Graviton – Hypothetical particles that carry the gravitational force.

Gravity – It is the force of attraction acting between bodies having either energy or mass.

Greenhouse Effect – A phenomenon in which the gases trap the heat energy. This rises the temperature.

Ground State – Lowest energy level of an electron in an atom.

Grounding – Process of connecting a charged object to earth to to remove the object's unbalanced charge.

(H)

Half-Life – Interval of time for half of a sample of radioactive material to decay.

Harmonics – Distortion of sinusoidal waveform by waveforms of different frequencies.

Heat – Energy transferred from one object to another as a result of temperature difference.

Heat Capacity – The amount of heat required to raise the unit temperature of a unit mass of a body.

Heat Engine – A device which converts heat/thermal energy to mechanical energy.

Heat Sink – A Component which absorbs heat to make the system cooler.

Heat Source – An object which produces heat.

Heat Transfer – Transfer of thermal /heat energy from one body/system to another body/system.

Heat of Fusion – Amount of energy needed to change a unit mass of a substance from solid state to its liquid state at its melting point.

Heat of Vaporization – Amount of energy needed to change a unit mass of a substance from liquid state to its gaseous state at its boiling point.

Heavy Water – A compound named as Deuterium dioxide (D_2O).

Heisenberg Uncertainty Principle – It states that more accurately one determines the position of a particle, the less accurately the momentum can be known of that particle and vice-versa.

Hertz – Derived unit of frequency.

Henry – It is the derived S.I. unit of electrical inductance.

Hole – Absence of an electron in a semiconductor.

Hook's Law – Deformation of an object is directly proportional to the force causing that deformation.

Horse Power – It is a commonly used unit of power. 1HP = 745.7 Watts.

Humidity – Measure of moisture content of air.

Huygens Principle – Each point on a light wavefront can be regarded as a source of secondary waves.

Hydraulic – Branch of science which deals with the practical application of physics.

Hydraulic System – A system which uses fluid power to operate.

(I)

Ideal Gas – A gas in which all collisions between atoms or molecules are perfectly elastic and in which there are no intermolecular forces of attraction.

Ignition Point – The minimum temperature required for combustion to start.

Illuminance – Amount of luminous flux per area.

Illuminated Object/Body – The objects/bodies which are capable of reflecting back the light.

Illumination – Rate at which electromagnetic wave energy falls on a surface.

Image – Reproduction of an object using a mirror or lens by reflecting/refracting the light.

Impedance – The effective resistance offered by an electric circuit or component to alternating current. It is the ratio of effective voltage to effective current in an A.C. circuit.

Impulse – Product of force and time interval over which it acts.

Impulsive Force – A force which acts for a very short period of time on a body/object.

Impulse-Momentum Theorem – It states that the impulse given to an object Is equal to change in its momentum.

Incandescent Body – A body which emits light due to its high temperature.

Incident Wave – A wave that strikes a boundary where it is either reflected or refracted.

Index of Refraction (Refractive Index) – The ratio of speed of

light in vacuum to speed of light in that body.

Inductance – Ratio of induced voltage to the rate of change of current causing it. A tendency of a conductor to oppose a change in the current flowing through it.

Induced Current – The current induced in an electric circuit due to change in magnetic flux/magnetic field.

Induced Magnetism – Magnetism produced in a ferromagnetic substance by the influence of an external magnetic field.

Induction – (i) A process of production of EMF across an electrical conductor in a changing magnetic field.

(ii)A process of charging one body by bringing it into the electric field of another charged body.

Induction Generator – A device which converts mechanical energy to electrical energy based on electromagnetic induction.

Inductive Resistance/Reactance – Opposition of current offered by an inductor in an AC circuit.

Inelastic Collision – A collision in which some of the kinetic energy is not conserved hence it is changed to some other form of energy.

Inertia – The tendency of an object/body to remain in its state of rest or motion.

Inertial Frame of Reference – A non-accelerating frame of reference which obeys the Newton's Laws of motion.

Inertial Mass – Ratio of net force exerted on an object to its acceleration.

Infrared Light – Electromagnetic waves with waves longer than those of visible light and shorter than those of radio waves.

Infrasonic Waves – Soundwaves having frequency less than 20Hz.

Initial Velocity – Velocity of an object at time t=0.

Instantaneous Acceleration – Acceleration at a specific time.

Instantaneous Current – The magnitude of a varying current at any instant of time.

Instantaneous Position – Position of an object at a specific time.

Instantaneous Velocity – Velocity of an object in motion at a specific time.

Instantaneous Voltage – The magnitude of a varying voltage at any instant of time.

Insulator – Substances which does not allow heat and electricity to pass through them.

Interference of Waves – A phenomena in which two waves superpose to form a resultant wave of greater, lower or the same amplitude.

Interaction – A process through which elementary particles interact with each other.

Interface – A surface which separates the phases of matter.

Internal Forces – Forces between objects within a system.

Intermolecular Forces – Forces of attraction or repulsion between the molecules.

Internal Energy – Sum of the kinetic energy and the potential energy of all molecules of an object.

Intrinsic Semiconductor – A semiconductor in which conduction is due to the host material, not due to added impurities. This is also known as pure semiconductor

Inverse Photoelectric Effect – The emission of photons of radiation from a material when bombarded with high-speed electrons.

Ionization Energy – The minimum amount of energy required to remove an electron from an atom.

Ionizing Radiation – Radiation travelling as particle or wave that can remove electrons from an atom.

Irregular Reflection – The reflection of light from a rough surface such that an incident ray is reflected at many angles rather than at just one angle.

Isolated System – A collection of objects not acted upon by external forces into which no external exchange can occur.

Isotope – Variants of element's atomic nuclei having same number of protons but different number of neutrons.

Isobaric Process – A process in which the pressure remains constant.

Isochoric/Isometric Process – A process in which the volume remains constant.

Isothermal Process – A process in which the temperature remains constant.

(J)

Joule – It is the S.I. unit of energy. It is also known as newton*meters.

Joule Heating – Production of heat in a conductor due to the passage of electric current.

Joule's Law of Heating – It states that when a current '***i***' passes through a conductor of resistance '***r***' for time '***t***' then the heat produced in the conductor is equal to the product of square of the current, the resistance and the time i.e., i^2rt.

NOTES

(K)

Kelvin – It is the S.I. unit of thermodynamic temperature.

Kelvin Temperature Scale – A thermodynamic temperature scale in which 0 kelvin is equal to absolute zero and 273.16 kelvin is equal to the triple point of water.

Kepler's First Law of Planetary Motion – All planets move in elliptical orbits with the sun at the focus.

Kepler's Second Law of Planetary Motion – The line joining a planet to the sun sweeps equal areas in equal time, in other words, the areal velocity of all the planets remains constant.

Kepler's Third Law of Planetary Motion – The square of the time period (time taken to complete one revolution) is directly proportional to the cube of average distance of the planet from the sun.

Kilocalorie – The amount of heat required to increase the temperature of 1kg water by 1^0 C. It is a unit of energy. 1Kcal = 1000cal.

Kilogram – It is the S.I. unit of mass. 1Kg = 1000g.

Kilowatt – It is a unit of electrical power. 1Kw = 1000watts

Kilowatt-Hour – Amount of energy equal to 3600000 J. It is generally used in electrical measurement.

Kinematics – Study of motion of object without the reference to the cause of this motion.

Kinetic Energy – Energy possessed by an object due to its motion.

Kinetic Friction – A force that acts between two moving surfaces sliding on each other.

Kirchhoff's First Law (The current law) – It states that the

algebraic sum of the current entering a node and exiting it must be equal to zero.

Kirchhoff's Second Law (The voltage law) – It states that sum of all voltages around a closed loop in any circuit must be equal to zero.

(L)

Laser – A device that stimulates atoms to emit light at particular wavelengths and amplifies that light, producing a very beam of light. 'LASER' stands for '**L**ight **A**mplification by **S**timulated **E**mission of **R**adiation'.

Laser Fusion – A method of creating nuclear fusion by using heat generated by intense laser beams.

Latent Heat – The heat or energy absorbed or released during the change of phase of a substance.

Latent Heat of Vaporization – The quantity of heat required to change a unit mass of liquid to vapor at constant temperature.

Latent Heat of Fusion – The quantity of heat required to change a unit mass of solid to liquid at constant temperature.

Lattice – The regular periodic arrangement of atoms and molecules in a crystal of semiconductor material.

Law of Conservation of Energy – In a closed/isolated system the total energy remains constant. Energy can neither be created nor be destroyed, it can just be transformed from one form to another.

Law of Heat Exchange – It states that heat can only be transformed from a hot object/body to a cold object/body where the heat lost by the hot object/body will be equal to the heat gained by the cold object/body.

Laws of Reflection – (i) The angle of incidence is equal to the angle of reflection.

(ii) The normal to the reflecting surface at the point of incidence, the incident ray and the reflected ray are in the same plane.

Laws of Refraction – (i) The normal to the reflecting surface at the point of incidence, the incident ray and the reflected ray are in the

same plane.

(ii) The angle of incidence 'i' and the angle of refraction 'r' satisfy the following equation: -

$(\text{Sin } i/\text{Sin } r) = (n_2/n_1)$

Where n_2/n_1 is the refractive index of second medium with respect to the first medium.

Lens – It is an optically designed transparent material bounded by two surfaces of which at least one surface is curved and is used to converge or diverge light.

Lenz's Law – It states that the direction of the electric current which is induced in a conductor by a changing magnetic field created by the induced current opposes the initial changing magnetic field.

Lepton – Particle that interacts with other particles only by the electroweak and gravitational interactions.

Light (visible) – Electromagnetic radiation with wavelengths between 400nm-700nm or simply it is a stream of photons.

Light Year – The total distance travelled by a beam of light in a year. 1 light year = $9.461*10^{15}$ meters.

Linear Accelerator – A device used to accelerate subatomic particles by applying successive electric field.

Liquefaction – The change of a solid or gas to liquid phase.

Liquid – A state of matter which has fixed volume but the shape is not fixed and is depends on the container it is stored in.

Lodestone –Naturally occurring magnetic rock.

Longitudinal Waves – A wave in which the direction of disturbance is same as the direction of travel of wave.

Long Wave Radiation – Infrared or radiant heat.

Longitudinal Strain – The ratio of change in length of a body to the initial length.

Lorentz Force – Force experienced by a charged particle due to electric or magnetic fields.

Lumen – It is the derived S.I. unit of luminous flux.

Luminous Intensity – Luminous flux per unit solid angle.

Luminous Flux – The measure of perceived power of light measured in lumens.

Luminous Object – An object/body which emits its own light.

Lux – It is the derived S.I. unit of illuminance measuring luminous flux per unit.

Lyman Series – A group of lines in the ultraviolet region in the spectrum of hydrogen.

(M)

Machine – A device which has several moving parts and can do a particular work.

Magnetic Domain – Small regions in permanent magnets within which atomic or molecular magnetic moments are aligned parallelly.

Magnetic Field – A region around a magnetic field where its magnetic influence can be felt.

Magnetic Field Strength – The force exerted by a magnetic field on a unit N pole situated in the field.

Magnetic Flux – Number of magnetic field lines passing through a given area.

Magnetic Flux Density – The amount of magnetic flux passing through a unit area.

Magnetic Force – The force of attraction or repulsion between two bodies associated with the motion of electric charges.

Magnetic Poles – The points from where the magnetic field lines seem to come out and enter back.

Magnetosphere – A region in the upper atmosphere in which the motion of charged particles is governed primarily by the magnetic field of earth.

Magnification – The ratio of the size of an optical image to the size of the object.

Malleability – A property that enables materials to be hammered and rolled in thin sheets.

Manipulated Variable – A variable which can be changed by the experimenter in an experiment.

Maser (MASER) – A device which produces coherent electromagnetic waves through amplification by stimulated emission. 'MASER' stands for '**M**icrowave **A**mplification by **S**timulated **E**mission of **R**adiation'.

Mass – The amount of matter contained in a body.

Mass Density – Mass per unit volume of a substance.

Mass Number – Number of nucleons (protons + neutrons) in the nucleus of an atom.

Mass Spectrometer – A device used for measuring the masses of isotopes, molecules and atoms.

Matter – Anything which has mass and it occupies some space.

Matter Wave – Wave like properties shown by particles such as electrons and photons.

Maxwell's Right-Hand Thumb Rule – If a straight current carrying wire is imagined to be held in the right hand, with the thumb stretched along the direction of the current, the direction of the magnetic field produced by the current is in the direction in which the fingers are curled.

Mean Life – The average time duration during which a system remains in a specified form.

Mechanical Advantage – The ratio of the force produced by a machine to the force applied to it.

Mechanical Energy – The sum of potential energy and kinetic energy.

Mechanical Resonance – A condition in which the natural oscillation frequency becomes equal to the frequency of driving force.

Mechanical Wave – A wave consisting of periodic motion of

matter.

Melting Point – The temperature at which a substance changes from its solid state to liquid state.

Meson – Medium massed subatomic particles containing one quark and 1 antiquark.

Metals – Elements which are lustrous, malleable, ductile, generally hard and good conductors of heat and electricity.

Meter – S.I. unit of length.

Micrometer – Unit of length (generally small length). 1 micrometer = 10^{-6} m.

Mirror Equation/Mirror Formula – $1/u + 1/v = 1/f$, where u is the object distance, v is the image distance and f is the focal length.

Moderator – The materials used to decrease speed of neutrons in nuclear reactor.

Modulus of Elasticity – The ratio of stress to the strain produced.

Modulus of Rigidity – The ratio of tangential stress to the shear strain produced in a body.

Molecule – The smallest fundamental unit of a chemical compound/substance that is capable of independent existence.

Moment of Inertia – The tendency to resist angular acceleration.

Momentum – Quantity of motion an object has. It is the product of object's mass and its velocity.

Monochromatic Light – Light having a single wavelength or light having only 1 color.

Motional EMF – An EMF induced due to the motion of the conductor across a magnetic field.

Motor (electric motor) – A device which converts electrical energy to mechanical energy.

Mutual Induction – The property of a coil which enables it to oppose the change in current in another coil or the property by which a changing current in one coil induces an emf in another coil.

Mutual Inductance – The property of a coil which affects/changes the current and voltage in secondary coil.

Myopia – A condition of eyes in which the near objects appear clearly but the far ones appear blurry. It is generally referred to as near sightedness.

(N)

N – type Semiconductor – It is a type of extrinsic semiconductor doped with impurities having 5 electrons in their valence shell. The negative charged is carried by electrons and the positive charge is carried by holes in this type of semiconductor.

Natural Frequency – The frequency of vibration of an elastic object that depends on the size, composition and shape of the object and not on the external forces.

Net Force – The vector sum of all the forces acting on an object.

Neutral (Object) – An object that has no net electric charge.

Neutrino – A subatomic particle that is very similar to an electron but has no electrical charge and a very little mass. It is a type of lepton.

Neutron – A subatomic particle with no net electrostatic charge and has a mass slightly higher than that of proton. It is a type of nucleon.

Newton – It is the derived S.I. unit of force.

Newton's First Law of Motion – It states that an object will remain at rest or in motion until and unless an external force is applied to it. It is also known as law of inertia.

Newton's Second Law of Motion – It states that rate of change of linear momentum of a body is directly proportional to the force applied on it.

Newton's Third Law of Motion – It states that to every action there is always an equal and opposite reaction.

Newton's Law of Gravitation – It states that gravitational force between two bodies is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

Newton's Law of Cooling – It states that the rate of loss of heat of a system is directly proportional to the temperature difference between the system and its surrounding.

Node – A point along a standing wave where the wave has minimum amplitude.

Noise – A sound made up of groups of waves of random frequency and intensity.

Non-Inertial Frame of Reference – An accelerating frame of reference with respect to an inertial.

Non-Uniform Speed – Unequal distances covered in equal intervals of time.

Non-Uniform Velocity – Unequal displacements covered in equal intervals of time.

Normal – An imaginary line perpendicular to the surface of interest.

Normal Force – A force which is perpendicular to the object on which it is applied.

Nuclear Binding Force – The force that acts within the small distances between nucleons.

Nuclear Energy – The energy released during the splitting of nucleus.

Nuclear Equation – An equation representing a nuclear reaction.

Nuclear Fission – A reaction in which large nucleus splits into small nuclei which are often equal in masses.

Nuclear Force – The strong force which acts between two nuclei or between protons and neutrons.

Nuclear Fusion – A reaction in which two or more nuclei combine to form one or more atomic nuclei or subatomic particles.

Nuclear Reaction – A process in which two or more nuclides are produced from the collision between two atomic nuclei.

Nuclear Reactor – A device used to control nuclear chain reactions.

Nuclear Transmutation – Change of one chemical element to another chemical element.

Nucleon – Subatomic particles present inside nucleus i.e. Either proton or neutron.

Nuclide – Nucleus of an isotope.

Nucleus – The central positively charged and dense part of an atom around which electrons rotate.

(O)

Object – A collection of matter within defined boundary and space.

Octave – Interval between two frequencies with a ratio of 2:1.

Ohm – S.I. unit of Resistance.

Ohm's Law – A law which states that the current flowing through a conductor is directly proportional to the potential difference across the conductor.

Opaque – Materials/Bodies which does not allows light or electromagnetic radiation to pass through them.

Optical Center– The central point of the lens.

Optical Density – A property of transparent material that is a measure of the speed of light through it.

Optic Fiber – A long, thin strand of fused silica used to transmit signals through light using the concept of total internal reflection.

Optics – The study of properties of visible light.

Orbit – The region around any planet or star where an object is held in circular motion due to the gravitational force.

Orbital – The region around a nucleus where an electron is likely to be found.

Origin – The point on a graph where x and y variables have 0 value at the same time.

Oscillation – A back and forth movement around an equilibrium position.

Oscillator – A device which produces periodic electric signals.

Oscillatory Motion – To & Fro movement of a body around its mean position.

Oscilloscope – A device used to see the waveforms.

NOTES

(P)

p-n Junction – A boundary between p & n type of semiconductor material inside a single semiconductor crystal.

P-type Semiconductor – It is a type of extrinsic semiconductor doped with impurities having 3 electrons in their valence shell. The holes are the majority charge carriers and free electrons are the minority charge carriers.

Pair Production – The formation of a subatomic particle and its antiparticle.

Parabolic Mirror – A concave mirror whose cross-section is shaped like the tip of a parabola.

Parallel Circuit – A circuit which has two or more paths for the electric current to flow.

Parallel Connection – A connection of two or more electrical devices between two points.

Para-Magnetism – The property of a substance by which it is weakly attracted to strong magnetic fields.

Pascal – It is the derived S.I. unit of pressure.

Pascal's Law – It states that pressure applied to an enclosed fluid is transmitted equally in all directions.

Peak Current – The maximum value of an alternating current during its half cycle.

Period – Time needed to repeat one complete cycle of motion.

Periodic Motion – A motion that repeats itself at equal intervals of time.

Photo Current – A current induced by radiant energy.

Photoelectric Effect – A phenomena in which electrons are emitted from a material that has absorbed electromagnetic radiation.

Photoelectrons – Electrons emitted from a light sensitive material when it is illuminated with light of sufficiently short wavelength.

Photons – It is a subatomic particle that carries electromagnetic force is the quantum of electromagnetic radiation.

Photovoltaic Cells – Device which converts electromagnetic radiation (light) into electrical energy.

Physics – Study of matter and energy and their behavior through space and time.

Piezoelectricity – Electric potential produced by deforming materials.

Pitch – Characteristic of sound based on its frequency.

Plane Mirror – A mirror having a flat and smooth reflecting surface.

Plasma – A state of matter in which atoms are separated into electrons and positive ions or bare nuclei.

Plasticity – The property of a solid whereby it undergoes a permanent change in shape or size when subjected to a stress.

Position Time Graph – It is a type of graph which is used to describe the motion of a body. It shows how much the position of an object is changed with respect to time.

Positron – Antiparticles equivalent to electrons.

Potential Difference – The difference in electric potential between two points or the work done in carrying a unit positive charge from one point to another.

Potential Energy – Energy possessed by an object due to its position or state.

Potentiometer – An electrical device which has a variable resistance.

Power – It is the rate of doing work or the rate of energy conversion.

Precision – Degree of exactness in a system.

Pressure – A normal force or a force applied perpendicularly per unit area.

Primary Cell – An electrochemical cell which produces electric current by an irreversible chemical reaction meaning we will have to change the primary cell after a period of time.

Primary Coil – A transformer coil that when connected to voltage source produces varying magnetic flux.

Principal Axis – The line joining the pole and the center of curvature of a spherical mirror.

Principal Focus – A point where the rays parallel to the principal axis converge or from where they diverge after reflection or refraction.

Principle of Calorimetry – It states that in a heat transfer, the heat lost by a body is equal to the heat gained by another body.

Progressive Wave – A wave which transfers energy from one part of a medium to another.

Projectile – An object which after being given an initial velocity is allowed to fall freely under the influence of gravity and air resistance.

Projectile Motion – A type of motion experienced by an object which after being given an initial velocity is allowed to fall freely under the influence of gravity and air resistance.

Proton – A subatomic particle carrying a positive charge and is present inside the nucleus of an atom.

Pulse – A single and non-repetitive disturbance.

(Q)

Quantum Mechanics – A branch of mechanics that deals with the study of matter using its wave properties.

Quantum Model of an Atom – This model describes an orbital as a 3-dimensional space around the nucleus within the atom, where the probability of finding an electron is the maximum.

Quantum Numbers – The set of numbers used to describe the position and energy of the electron in an atom.

Quark – Fundamental particles of matter. Building blocks of protons, neutrons, etc.

(R)

Radiant Energy – Energy of electromagnetic waves transferred by electromagnetic radiation.

Radiation – Energy given out by matter which is transmitted in the form of wave energy without any material medium.

Radio Waves – A type of electromagnetic radiation with wavelengths longer than that of infrared light and is generally used in communication.

Radioactive Decay – Spontaneous breakdown of a nuclei which results to release of energy and matter from the nuclei.

Radioactive Decay Law – The rate of disintegration of a radioactive substance is directly proportional to the number of undecayed nuclei.

Radioactive Material – Material that can go under radioactive decay.

Radioactivity – Spontaneous emission of particles or energy from an atomic nucleus as it disintegrates.

Radius of Curvature – The distance between pole and the center of curvature of a spherical mirror.

Range of Projectile – Horizontal displacement between the launch point and final point.

Rarefaction – A region in a longitudinal wave where the waves are Farthest.

Ray – A straight single line of light from a luminous point.

Ray Optics – Study of light using the ray model of light i.e. Light may be represented by straight line along the direction of motion.

Reactance – The inductive, capacitive and non-resistive opposition

to the current in a circuit.

Real Image – An image formed by the actual intersection of light rays.

Rectifier – A device used to convert alternating current to direct current. Two types of rectifiers are there- Half wave rectifier and full wave rectifier.

Rectilinear Motion – The motion of a body along a straight path.

Reference Level – Location at which potential energy is chosen to be zero.

Reference Point – Something that is used to compare something else.

Reflection – Bouncing back of light when an incident ray hits a smooth polished surface.

Reflected Ray – A ray of light which is thrown back after hitting a smooth polished surface.

Refraction – The change of medium in the path of light which generally leads to bending of the light.

Refractive Index – The ratio of speed of light in vacuum to the speed of light in the medium.

Refrigeration – The process of the absorption of heat from one source and its transfer to another source for rejection or recuperation.

Regular Reflection – Reflection from a polished surface in which scattering effect is negligible.

Relative Humidity – The ratio of partial water vapor pressure in the atmosphere to the equilibrium vapor pressure.

Relative Density – The ratio of density of a substance to the density

of water (in case the substance is liquid or solid) or air (in case the substance is gas).

Relativistic Mass – The mass of an object in motion with respect to observer.

Residual Magnetism – Magnetism retained in a magnet after the magnetizing field has been removed.

Resistance – The property of a substance due to which it opposes the flow of electric current through it. It can also be defined as the Ratio of potential difference across a conductor to the current flowing through that conductor.

Resistive Force – A force that opposes the velocity of a body.

Resistor – It is an electrical component which reduces the flow of current due to the implementation of resistance.

Resonance – A phenomenon in which an external force or vibrating system forces another system around it to vibrate with greater amplitude at a specific frequency of operation.

Rest energy – Energy possessed by an object due to its mass.

Rest mass – Mass of an object which is at rest i.e. it is not in motion.

Restoring Force – A force which tends to bring a displaced body to its mean position.

Resultant – The vector sum of two or more vectors.

Resultant Force – A single force acting on a body which produces the same effect as produced by all other forces collectively.

Retardation – Acceleration in negative direction.

Reverberation – Persistence of sound due to repeated reflection from surfaces.

Rheostat – A Device with variable resistance.

Rigid Body – An idealized extended body whose size or shape is fixed and remains constant when forces are applied on it.

RMS – **R**oot **M**ean **S**quare is the effective value of the total waveform.

Rotational Kinetic Energy – The energy possessed by an object which is rotating around an axis.

Rotational Motion – A motion in which every point of the body moves along a circular path along a common axis.

(S)

Scalar Quantity – A quantity which only has magnitude and no direction.

Schematic Diagram – Representation of electric circuit using symbols.

Scintillation – A flash of light emitted when substance is struck by radiation.

Second – Fundamental S.I. unit of time.

Seconds Pendulum – A simple pendulum whose time period on the earth's surface is 2 seconds.

Secondary Coil – A transformer coil in which varying EMF is induced.

Seed-Back Effect – The generation of an electric current when two conductors of different metals are joined at their ends to forma circuit with the two junctions kept at different temperatures Self-inductance: Induced EMF produced in coil by changing current.

Semiconductors – Material in which electrical conduction is smaller than that in a conductor, but more than in insulator.

Series Circuit – A circuit in which electric current flows through each component, one after another.

Series Connection – Arrangement of electrical devices so that there is only one path through which current can flow.

Shear Strain – The ratio of the amount of deformation of the side of a body to the length of the side.

Shear Stress – A type of stress produced when two body slides past one another.

Short Circuit – Abnormal connection between two terminals with very low resistance.

Siemens – Derived S.I. unit of electric conductance.

Silicon – It is widely used semiconductor generally used in manufacturing of I.C. and transistors.

Simple Machine – A mechanical device that changes the direction or magnitude of a force.

Simple Pendulum – A heavy point mass suspended by a light inextensible string from a frictionless rigid support.

Simple Harmonic motion – A motion in which the restoring force is directly proportional to the displacement of the body from its mean position.'

Simple Harmonic Oscillator – An object that moves around a stable equilibrium point and experiences a restoring force that is directly proportional to the oscillator's displacement.

Sine – The ratio of the opposite side to the hypotenuse.

Sine Wave – A continuous wave describing a curved smooth periodic oscillation.

Snell's Law – The ratio of sin of angle of incidence to the sin of angle of refraction is constant and is equal to the refractive index of medium 2 w.r.t medium 1.

Solar Cell – A Device which converts solar energy to electrical energy. It is also known as a photovoltaic cell.

Solar Energy – Radiant energy (heat and light) transmitted by sun.

Solenoid – A long insulated wire that is tightly wounded in the shape of a spring, with closely spaced turns that lie side by side.

Solid – A state of matter that has fixed volume and shape.

Sonic Boom – Sound waves that pile up into a shock wave when a source is travelling at or faster than the speed of sound.

Sonometer – A device which used for testing the frequency of strings and for showing how they vibrate.

Sound Intensity – The amount of sound energy flowing through a unit area.

Spark Chamber – A type of particle detector.

Specific Heat – Ratio of the quantity of heat required to raise the temperature of a body one degree to that required to raise the temperature of an equal mass of water one degree.

Specific Humidity – Mass of water vapor present in unit mass of moist air.

Speed – Distance travelled per unit time.

Spherical Aberration – Inability of spherical mirror to focus all parallel rays to a single point.

Standing Wave – Waves which appear to be vibrating vertically without travelling horizontally.

State of Motion – When a body changes its position w.r.t a fixed point, then it is said to be in state of motion.

Static Friction – The frictional force which acts between two bodies at rest that opposes the start of motion between them.

Stefan Boltzmann Law – The amount of energy radiated per second per unit area of a perfectly black body is directly proportional to the fourth power of the absolute temperature of the surface of the body.

Step-Down Transformer – Transformer with output voltage smaller than input voltage. In other words, these transformers reduce the input voltage.

Step-up Transformer – Transformer with output voltage greater than input voltage. In other words, these transformers increase the input voltage.

Stimulated Emission – Emission of photons from excited atom caused by impact of photons having the same energy.

Strain – The relative amount of distortion/deformation produced in a body under stress.

Stress – The Force applied per unit area causing deformation or distortion.

Sublimation – The change of a solid to a gaseous state without passing through liquid phase.

Superconductivity – The condition of zero resistivity below the transition temperature of a substance.

Superconductors – The electrical conductors having no resistance at zero temperatures.

Superpositions – Combining the displacements of two or more waves vectorially to produce a resultant displacement.

Surface Tension – The tendency of a liquid surface to contract Itself.

Synchrotron – Device used to accelerate particles. In synchrotron the particles move in a circular path.

System – A well-defined collection of objects.

(T)

Tangent – A straight line that touches a point on a curve.

Temperature – It is the measure of hotness or coldness of an object/substance on a quantitative scale.

Tension Force – The force that is transmitted along ropes or cables when pulled by forces acting from opposite side.

Terminal Velocity – Velocity of a falling object when magnitude of force of air resistance equals to magnitude of its weight.

Tesla – It is the derived S.I. unit of magnetic flux density.

Test Charge – A charge of very small magnitude that is used to test or find field of some other charge is known as a test charge.

Thermal Capacity – The amount of heat needed to change the temp of a body by one unit per unit mass of that material.

Thermal Efficiency – The percentage of heat that is converted into useful work.

Thermal Energy – Energy contained within a system that is responsible for its temperature.

Thermal Equilibrium – The state between two or more bodies where temperature do not change.

Thermal Expansion – Increase in length/breadth or volume of object due to change in temperature of the body.

Thermionic Emission – The discharge of electrons from the surface of a hot body.

Thermocouple – An electrical device composed of two dissimilar metals forming a junction.

Thermodynamics – Study of quantitative relationship between heat and other forms of energy.

Thermometer – An instrument used to measure temperature.

Thermonuclear Reaction – It is a nuclear fission reaction which requires temperature above million degrees.

Thin-Film Interference – Light interference caused by reflection from both front and rear surface of thin layer of liquid or solid.

Third Law of Thermodynamics – The entropy of a system is zero and defined constant. In other words, nothing can be cooled to absolute zero.

Threshold Frequency – The minimum frequency of electromagnetic radiation that is necessary to release photoelectrons from that metal.

Time Interval – The difference between two time irrespective of when they started or when they ended.

Time Period (of a wave) – The time taken by a wave to travel through a distance equal to its wavelength is called time period.

Time Period (of an oscillation) – Time taken to complete one oscillation.

Tokamak – A type of nuclear reactor.

Torque – It is the rotational equivalent of linear force.

Total Internal Reflection – The total refection of light travelling in a medium of higher refractive index when it is incident on the boundary with another medium of lower refractive index at an angle greater than the critical angle.

Trajectory – The path followed by projectile.

Transformer – An electrical device which transfers Alternating

current from one circuit to another circuit but by altering the voltage levels.

Transistor – A semiconductor based electrical device which is used to amplify or switch electronic signals or powers.

Translational Motion – The movement of a rigid body's center of mass in space.

Translucent Materials – Materials which allow partial light to travel through them or the materials which distorts the path of light travelling through it.

Transparent Materials – Materials which allow light to pass through them without any distortion.

Transverse Wave – Waves in which oscillations are perpendicular to the direction of travel of wave.

Triode – A vacuum tube containing three electrodes used to amplify electric current.

Triple Point – The temperature and pressure at which the solid, liquid and the gaseous phase of a substance can coexist in stable equilibrium.

Trough (of a wave) – The lowest point of a wave motion.

NOTES

(U)

Ultrasonic Waves – Sound waves with a frequency above than 20000 Hz.

Ultraviolet Light – Electromagnetic radiation having a wavelength between 4 to 400 nanometers.

Unbalanced Forces – When the net force acting on a body is not zero.

Uncertainty Principle – It states that it is impossible to simultaneously specify both the position of an object and its momentum.

Uniform Acceleration – Equal change in velocity in equal interval of time.

Uniform Speed – Equal distances covered in equal intervals of time.

Uniform Velocity – Equal displacements covered in equal intervals of time.

Unit Vector – A vector having a magnitude of 1.

Unity – A new unit of length. Unity is the speed of light in vacuum.

Universal Gravitational Constant – It is the constant of proportionality in Newton's law of gravitation which is equal to 6.673×10^{-11} N m^2 kg^{-2} and its symbol is '**G**'.

Universal Law of Gravitation – It states that the gravitational force of attraction between any two particles is directly proportional to the product of the masses of the particles and is inversely proportional to the square of the distance between the particles. The direction of the force is along the line joining the two particles.

Unpolarized Light – A light consisting of transverse waves vibrating in all possible directions.

(V)

Van de Graff Generator – A Van de Graaff generator is an electrostatic generator which uses a moving belt to accumulate electric charge on a hollow metal globe on the top of an insulated column, creating very high electric potentials.

Vector Quantity – A quantity having both magnitude and direction.

Velocity – Displacement of a body per unit time.

Virtual Image – An image formed when actual rays of light responsible for the image does not actually intersect.

Viscosity – The internal friction of a moving fluid which resist it to flow.

Visible Radiation/Spectrum – The visible portion of electromagnetic spectrum. It has wavelengths between 380 nanometers to 700 nanometers approx.

Volatile Substance – Gases or chemicals which can easily vaporize at room temperature quickly.

Voltage – The difference between electric potential at two points.

Voltage Drop – The amount of voltage loss in an electric circuit due to resistance or impedance.

Voltameter/Voltmeter – A device used to measure potential difference across a conductor or electric circuit.

Volume – The amount of space occupied by an object or substance.

(W)

Watt – It is the unit of power.

Watt-Hour – It is a unit of electricity consumption. When one watt of power/electricity is consumed over the time of one hour, it is known as watt hour

Wave – A disturbance or oscillation that moves through a medium.

Waveform –The graphical representation of a signal with respect to time.

Wave Motion – The movement of a disturbance from on part of a medium to another involving the transfer of energy but not transfer of matter.

Wave Pulse – A single and non-repetitive disturbance moving through a medium.

Wave Speed – The speed at which a wave crest or trough propagates.

Wave Velocity – The displacement done by a wave in one second.

Wavelength – The distance between one crest to another or one trough to another in a wave.

Weak Boson –A particle which carries or transmits the weak interaction of force.

Weak Interaction – A weak force or a weak nuclear force

Weber –It is the S.I. unit of magnetic flux.

Weight – The force of gravity acting on a body.

Wheatstone Bridge – It is a electrical circuit (instrument/device) used for the measurement of electric resistance.

Wilson Cloud Chamber – It is a particle detector containing supersaturated vapors of water or alcohol through which ionizing radiation leaves trails of visible droplets.

Work – An event in which a force causes a displacement. It is the product of force and the displacement (in the direction of force).

Work Function – Minimum temperature required to remove an electron from a solid.

Work-Energy Theorem – It states that work done on an object is equal to the change in its kinetic energy.

(X)

X-rays – Electromagnetic radiation which has high frequency, high energy but smaller wavelength.

X-ray Diffraction – A complicated technique using x-rays to create an image where no lenses to focus the light rays is available.

X-rays Imaging – A technology using x-rays through which we can create a picture of our inner body structure.

(Y)

Young's Modulus – It is the measure of stress-strain relationship on an object.

(Z)

Zeeman's Effect – The splitting of the spectral lines in a spectrum when the source is exposed to magnetic field.

Zero-Point Energy – The lowest energy state of molecular vibration.

Zeroth Law of Thermodynamics – If body A is in thermal equilibrium with body B and B is also in thermal equilibrium with C then A is necessarily in thermal equilibrium with C.

NOTES

2

PRINCIPAL SYSTEM OF UNITS

1. S.I. SYSTEM OF UNITS

The **International System of Units** (**SI**, abbreviated from the French *Système international (d'unités)*) is the modern form of the Metric system. It is the only System of measurement with an official status in nearly every country in the world. It comprises a coherent system of units of measurement starting with seven base units, which are the second (the unit of time with the symbol s), meter (length, m), kilogram (mass, kg), ampere (electric current, A), kelvin (thermodynamic temperature, K), mole (amount of substance, mol), and candela (luminous intensity, cd). The system allows for an unlimited number of additional units, called derived units, which can always be represented as products of powers of the base units. Twenty-two derived units have been provided with special names and symbols. The seven base units and the 22 derived units with special names and symbols may be used in combination to express other derived units, which are adopted to facilitate measurement of diverse quantities. The SI system also provides twenty prefixes to the unit names and unit symbols that may be used when specifying power-of-ten (i.e. decimal) multiples and sub-multiples of SI units. The SI is intended to be an evolving system; units and prefixes are created and unit definitions are modified through international agreement as the technology of measurement progresses and the precision of measurements improves.

Source- Wikipedia

Fundamental Quantities

S.no	Fundamental quantity	Fundamental unit	Symbol
1.	Mass	Kilogram	Kg
2.	Length	Meter	m
3.	Time	Second	s
4.	Temperature	Kelvin	K
5.	Luminous intensity	Candela	cd
6.	Electric current	Ampere	A
7.	Amount of substance	Mole	mol

Supplementary Quantities

1.	Plane angle	Radian	rad
2.	Solid angle	Steradian	sr

STANDARDS IN S.I. SYSTEM

1) **1 Kg:** The weight of a cylindrical prototype mass made of platinum and iridium alloys of height 39 mm and diameter 39 mm.

2) **1 Meter:** It is the distance Travelled by light in vacuum in 1/299792458 of a second.

3) **1 Second:** It is the time in which cesium-133 atom vibrates 9,192,631,770 times in an atomic clock.

4) **1 Kelvin:** It is the 1/273.16 part of the thermodynamic temperature of the triple point of water.

5) **1 Candela:** It is the luminous intensity of an ideal source by an area of cm^2 when the source is at the melting point of platinum i.e., 1760^o Celsius.

6) **1 Ampere:** It is the current generated when 1 Coulomb of charge flows through a conductor of any length in 1 second of time.

7) **1 Mole:** It is equal to $6.022*10^{23}$ Units of a substance (such as atoms. Molecules, or ions).

3

INTERESTING QUESTIONS

How do X-rays see through you?

X-rays are stopped only by the bones and especially dense bits of the body. They pass through the soft bits to hit a photographic plate on the far side of the body, where they leave a silhouette the skeleton.

Why is the SUN red at time of sunrise and sunset?

The sun is only red at sunrise and sunset, when the sun is low in the sky and sunlight reaches us only after passing a long way through the dense lower layers of the atmosphere. Particles in the air absorb shorter, bluer wavelength of light or reflect them away from us, leaving just the red.

What's the difference between heat and temperature?

Heat is molecules moving, it is a form of energy- the combined energy of all the moving molecules. Temperature, on the other hand, is simply a measure of how fast all the molecules are moving.

Why does Sweating keep you cool?

Because sweat is nearly all water, and water need warmth to turn to vapor- which we call 'drying'. Watery sweat dries from the skin by taking warmth from the body. This makes the body cooler.

What's the difference between mass and weight?

Mass is the amount of matter in an object. It is the same wherever you measure it, even on the Moon. Weight is a measure of the force of gravity on an object. It varies according to where you measure it.

What is Electrolysis?

Electrolysis is a chemical reaction caused when an electric current is passed through a solution- the electrolyte. The effect is to make positive ions (or cations) move to negative terminals (the cathode) and the negative ions (or anions) move to the positive terminal (the anode).

What is an Atomic Bomb?

An atomic bomb or A-bomb is one of the two main kinds of nuclear weapon. An A-bomb relies on the explosive nuclear fission of uranium-235 or platinium-239. Hydrogen bombs, also called H-bombs or thermonuclear weapons, rely on the fusion of hydrogen atoms to create explosion a thousand times more powerful.

What is the lightest Element?

The lightest element is hydrogen. It has just one proton in its nucleus and has an atomic mass of just one.

What substance has the highest Melting point?

The metal with the highest melting point is tungsten, which melts at 3,420°C (6,188°F). But the highest melting point of any substance

belongs to carbon, which melts at 3,530°C (6,386°F).

What substance has the lowest Freezing Point?

Mercury has the lowest freezing point of any metal - 38.87°C (-37.96°F). Helium has the lowest freezing point of all the substances - -272.2°C (-457.96°F), less than 1° above absolute zero.

How big are Atoms?

Atoms are about a ten millionth of millimeter across and weigh 100 trillionths of a trillionth of a gram. The smallest atom is hydrogen; the biggest is meitnerium. (Since they are so small, atoms are measured in terms of 'moles', which is a quantity of the substance containing the same number of atoms as12 grams of a form of carbon caller carbon 12.)

What are Noble Gases?

Group 0 is the furthest right-hand column of the periodic table. This group is called the noble gases, because they have full-up outer electron shells and so nobly stay aloof from any reaction with 'base' metals or any other substance. They are called inert gases.

Why is Carbon so special?

Carbon is the friendliest element in the Universe. With four electrons in the outer shell of its atom (and so four gaps), carbon atoms link very readily with other atoms.

What is Fire?

Fire is a chemical reaction in which one substance gets so hot that it combines with oxygen within the air.

What's the Air made of?

Pure air is 78.9% nitrogen, 20.95% oxygen. There are traces of argon (0.93%), carbon dioxide (0.03%), helium (0.0005%), neon (0.018%), krypton (0.001%), xenon (0.0001%), radon, etc.

What is the difference between Velocity and Speed?

Speed is how fast something is going. Velocity is how fast something is going and in which direction. Speed is therefor called a scalar quantity; velocity a vector.

ABOUT THE AUTHORS

Yash Sharma is author of the book "Childlike terms of Physics".
A professionally trained Robot designer, he has spent the last few years reading and writing various research papers based on physics and electronics. Yash is also the recipient of the Inspire awards by the government of India. He lives and works out of his home at Sarnath in Varanasi (India).

Nitish Kumar is co-author of the book "Childlike terms of physics".
Nitish has completed his B. Tech (hons.) in mechanical engineering from AKTU. He is handy with AutoCAD Catia Solidworks software. His hobbies include poetry and music. Nitish lives and works out of his home at Lucknow (India).

NOTES

Extreme care has been put into validating the veracity of the content in this book. However, if there is any error found, please do report to us on the below email.

electrostorms@protonmail.com